VA RAPID Query Consolidatied Report

RAPID Query Reference : VAQ001

Query : Please provide copies of the following:

* SEA Assessment

* HRA Assessment

* WFD Assessment

* NCA & BNG Assessment

* Carbon Assessment

* INNS Assessment

Response :

The following annex documents have been uploaded to the RAPID portal:

* SEA Assessment

* HRA Assessment

* WFD Assessment

* NCA & BNG Assessment

* INNS Assessment

Please note:

In all cases the documents submitted to RAPID contain information that is commercially confidential. Please ensure that appropriate steps and safeguards are observed in order to maintain the security and confidentiality of this information. Any requests made to RAPID or any organisation party by third parties through the Freedom of Information Act 2000, the Environmental Information Regulations 2004, or any other applicable legislation requires prior consultation and consent by United Utilities before information is released as per the requirements under the respective legislations. The content of these reports are draft and relates to material or data which is still in the course of completion in travel to Gate 2 and should not be relied upon at this early stage of development. We continue to develop our thinking and our approach to the issues raised in the document in preparation for Gate 2.

A Carbon Assessment has not been produced however Carbon has been considered as part of the Gate 1 Submission and in the production of the Conceptual Design Report. Please see below :

VA RAPID Query Consolidatied Report

VA SROs Carbon Calculations

Embodied carbon outputs produced from the UU estimating tool relate to a formula associated with each cost element. The carbon amounts are driven by the same yardsticks as those applied to the formula(s) to generate the options capex cost. It comprises an automated series of equations. These are calculated based on quantities of materials with high amounts of carbon and multiplied by carbon coefficients from the Bath University Inventory of Carbon & Energy v2.0.

Operational carbon has also been calculated from outputs produced from the UU estimating tool and includes carbon derived from electricity and chemicals. A split between fixed and variable operational carbon was calculated. Fixed operational carbon relates to any carbon related to an asset being ready to deliver water not related to the volume of water delivered (i.e. keeping a plant operational). Variable operational carbon relates to any carbon related to the volume of water delivered (i.e. pumping or chemicals).

A summary of the carbon data of the UUS source options are summarised in the table below :

Option name	Embodied Carbon	Operational Carbon (fixed and variable)
Units	(tCO2e)	(tCO2e)
VA Option A1	26,679	2,056
VA Option A2	77,400	8,706
VA Option A3	84,141	10,852
VA Option A4	109,842	14,660
VA Option B	43,319	3,463

VA RAPID Query Consolidatied Report

RAPID Query Reference : VAQ002

Query Please could we receive a response to the following queries on utilisation:

a) Please explain what assumptions have been made regarding scheme utilisation to inform the Opex costs. Please explain the reasoning behind the utilisation value(s) used.

b) Please expand on what outputs from WRSE modelling are expected, and how these, and the regional plan outputs, will be used to calculate and refine utilisation figures for Gate 2.

Response :

a) For the VA SRO we have developed enabling works to facilitate various water transfer volumes up to 180 Ml/d in combination with the UU Source SRO. We have then assumed a utilisation of 100% for each transfer volume solely for the purposes of calculating Opex costs at Gate 1, which aided the cost benefit analysis comparison. We recognise that utilisation is likely to be much lower in reality, however the enabling works scope in the VA SRO will not be significantly affected by variations in utilisation. The impact of utilisation changes will have a greater impact on UU Sources SRO as described in part b) and the response to query UUS002.

b) Changes to the utilisation pattern will affect how many and which UU source options are needed to maintain resilience of supplies to UU customers. This would in turn have an impact on the cost and therefore the bulk supply price. The utilisation pattern may change depending on the combination of options selected in the WRSE plan and also other significant wider resource positions in the South East (e.g. levels of demand or major sustainability reductions)

We would expect WRSE to review the STT utilisation patterns and confirm whether they remain valid or have changed once their options selection becomes clear and at other points where their plan may change. We will then be able to assess the materiality of any new utilisation pattern and therefore whether changes to the UU Sources may need to be selected and reflected in the costs of the option for WRSE. We would expect this confirmation through the regional plan reconciliation windows.

VA RAPID Query Consolidatied Report

RAPID Query Reference : VAQ003

B3 water resources benefits

1) Please provide details of the approach / methodology, and findings that examine the resilience of the resource availability in Vyrnwy reservoir in supplying the 180 Ml/d support during drought events.

2) Please reference the section of the gate 1 submission where wider resilience benefits are discussed, or provide any supplementary details as appropriate.

Response :

1) 180 Ml/d is our calculated maximum Vyrnwy release rate. It was based on the reservoir yield, as calculated using a c.100 year historical record.

This calculation assumes that 180 Ml/d is released every day, therefore in reality the maximum daily release could potentially exceed 180 Ml/d from a resilience perspective, depending on the level and pattern of utilisation. There are several other factors such as environmental impacts due to increased river flows which could also constrain the maximum release rate.

Releasing water not only impacts on the resilience of Vyrnwy but our Strategic Resource Zone as a whole, hence the need for the UU Sources SRO.

2) As outlined in our response to query UUS002, we performed sophisticated modelling to ensure that 180 Ml/d releases would not compromise the resilience of Lake Vyrnwy or the resource zone as a whole. This involved using stochastic hydrology to simulate a range of plausible severe and extreme droughts, with different return periods, as well as several climate change scenarios.

The wider resilience benefits of the VA SRO are limited as it focusses mainly on maintaining supplies to customers during trading through the utilisation of existing assets. However in doing this it does facilitate the support of wider water transfers and improved resilience for other regions. [✂]. There may be additional in region resilience benefits for sub options with bi-directional capabilities which could mitigate outages in other parts of the network.

VA RAPID Query Consolidatied Report

RAPID Query Reference : VAQ004

Query : Key risks and mitigation measures

Please can you confirm where in the submission you consider potential regulatory barriers relating to Welsh legislation, and confirm what the potential barriers are (if any).

Response :

We have considered the potential impacts of Welsh legislation and regulation, however at this stage we do not perceive these to be barriers to scheme progression as they can be addressed through further feasibility assessments and continued proactive engagement with the relevant regulatory bodies.

As detailed in our submission, engagement at this stage of the SRO process has primarily been through Water Resources West (WRW). As part of this engagement, we have started early conversations with both regulators and the Welsh Government to understand what would need to be considered as part of any SRO that sources water from Welsh catchments. It is recognised that any transfer must demonstrate a benefit to Wales and the Welsh people, as well as contributing towards the wellbeing goals under the Welsh Government's 'Well-being of Future Generations Act'.

WRW are working closely with Natural Resources Wales (NRW) to ensure all parties work together to identify solutions to the challenges faced with water resources. To do that WRW are mindful of the Area Statements that outline the key challenges and opportunities in the differing areas of Wales and how best any water transfer, that was selected as part of a regional plan, addresses those challenges and realises the opportunities. At an SRO level we have also engaged with NRW regarding the options under consideration and incorporated their feedback into the development of our Gate 2 Environmental Monitoring Plan (EMP).

We also recognise there are differences in the planning regime in Wales, however only a small section of the Vyrnwy Aqueduct crosses into Wales and would potentially be within the jurisdiction of the Welsh planning process. The implications of this will be addressed during Gate 2 as part of the detailed design process which will determine the location of possible engineering works. If planning consent is required United Utilities have successful experience of using the Welsh process and we do not foresee this being a barrier.

VA RAPID Query Consolidatied Report

RAPID Query Reference : VAQ005

Query

1. Please provide a brief outline of the method used to determine the carbon emissions of the project.

2. Please provide a brief outline of how the carbon emissions of the project will be managed, highlighting how the approach will be guided by the commitments on carbon developed by the All Company Working Group.

Response :

1. Embodied carbon outputs produced from the UU estimating tool relate to a formula associated with each cost element (eg. Water Pipeline - 750mm diameter in grass in trench, Buildings and Site Infrastructure - Modular Kiosk Buildings). The carbon amounts are driven by the same measures as those applied to the formula(s) to generate the options capex cost. These carbon values are calculated based on quantities of materials (eg. m and m3 respectively) with high amounts of carbon and multiplied by carbon coefficients from the Bath University Inventory of Carbon & Energy v2.0.

Operational carbon has also been calculated from outputs produced from the UU estimating tool and includes carbon derived from electricity and chemicals. A split between fixed and variable operational carbon was calculated. Fixed operational carbon relates to any carbon related to an asset being ready to deliver water not related to the volume of water delivered (i.e. keeping a plant operational). Variable operational carbon relates to any carbon related to the volume of water delivered (i.e. pumping or chemicals). The carbon amounts are driven by the same measures as those applied to the formula(s) to generate the options opex cost. Carbon values are calculated based on quantities of materials with high amounts of carbon and multiplied by carbon coefficients from the Bath University Inventory of Carbon & Energy v2.0.

2. UU have been active participants in the All Company Working Group (ACWG) Carbon Task & Finish Group which has developed the SRO carbon ambitions shared with RAPID.

These ambitions will be considered in the development of options during Gate 2 to ensure that we minimise the carbon impact of our solution.

With optimum value engineering in mind, some early opportunities to mitigate capital carbon include the use of materials with lower carbon emissions (such as maximising structural efficiency and longevity by the use of polyethylene pipework instead of ductile iron or steel), optimisation of pipeline routes, lower carbon construction techniques and use of lower carbon plant and machinery.

With respect to operational carbon the main focus will be on minimising energy usage associated with the potential introduction of a pumped system on the Vyrnwy Aqueduct. This could include the installation of high efficiency motors on pumps and application of ‘systems thinking’ to investigate the

use of automated monitoring and control to reduce manual operational interventions. Where energy is required we will seek to source this through on site renewable generation or through purchase of renewable energy.

Exploration of low carbon opportunities will also be informed by United Utilities' climate change mitigation strategy which covers four themes: vision and visibility; ambition and commitment; demonstrating action; and beyond here and now demonstrating that we recognise that carbon management is not just greenhouse gas accounting.

We share the net zero ambition of the UK water industry launched in November 2020 as the 'Net Zero 2030 Routemap: Unlocking a net zero future' including the emission reduction hierarchy. We have committed to an ambition that our water emissions (scope 1, 2 and elements of scope 3) will be net zero from 2030 and are official members of the Water UK partnership for the UN Race to Zero.

VA RAPID Query Consolidatied Report

RAPID Query Reference : VAQ006

Query : Please clarify the difference between capex and opex cost values reported in Table 13 and those reported in Table 14.

Response:

Table 13 summarises the CAPEX Net Present Value (NPV) obtained by the All Company Working Group (ACWG) agreed methodology, which includes the weighted average cost of capital (WACC). Table 14 summarises the CAPEX estimates by UU's estimating team.

Query : Please clarify how your projected solution cost estimates have changed between total solution costs submitted in WRMP19 or those proposed at PR19 and the current Gate 1 submission, where possible providing a breakdown and comparison of the cost estimates where they are comparable. Please explain clearly any changes, added/eliminated cost items or activities, or developments that contributed to the difference. Where possible, please use data in WRMI tables for a more detailed cost comparison. If costs have not been published in WRMI tables, please use the next best data source available.

Response:

In PR19 1 solution was put forward involving a trade of upto 180Ml/d, whereas in the Gate 1 submission 5 options were put forward to provide trade volumes between 75Ml/d to 180Ml/d, to ensure that the solutions are cost effective, offer flexibility and are resilient.

Only 1 of the 5 options are comparable in the two submissions and all options will require further detailed assessment as part of Gate 2.

The changes in costs between PR19 and latest project solutions at Gate 1 are summarised below:

* Increase in options scope due to further definition in design. For example all trade volumes above 75 Ml/d, we have increased the scope of the solution in the following areas:

    o [✂]

    o [✂]

    o Inclusion and requirement of process modifications on the inlet works to accommodate varying blends of water.

VA RAPID Query Consolidatied Report

* Optimism Bias was added based on the ACWG Cost Consistency Methodology (typically 24% – 27%)

* Change to construction costs using latest market information

* Change in base date of prices

* Project risk was increased from PR19 (based on UU commercial information).

* UU Corporate Overhead has increased from PR19.

VA RAPID Query Consolidatied Report

RAPID Query Reference : VAQ007

Query : Please could you indicate any societal and amenity costs / benefits that have been considered for the scheme, and how these have been included in the AISC for best value analysis (such as the UU methodology referred to).

Response :

The Vyrnwy Aqueduct solution, specifically Option A, includes the reuse of existing assets to provide a cost effective solution (for customers). There is minimal opportunity on these options to accommodate societal and amenity costs / benefits but this will be assessed in more detail at Gate 2 and will include any opportunities identified in AISC. Sub option B will require further definition to understand these opportunities.

The AISC includes electricity and carbon data to calculate societal costs. Carbon costs consist of three aspects for each option:

* Implementation Related Carbon Costs - The carbon costs attributed to the design and implementation of the option, including vehicle movements during implementation of the option.

* Fixed Operation Related Carbon Costs – Fixed power required to operate the option and the number of vehicle movements per year.

* Variable Operation Related Carbon Costs - The variable carbon costs attributed to the operation of the option, including power.

Electricity consumption is converted into CO2 equivalent using an 'electricity emission factor' which was obtained from the HM Treasury Greenbook

Supplementary guidance (Data tables 1 to 19 for Green Book supplementary guidance: valuation of energy use and greenhouse gas emissions for appraisal). This emission factor is profiled over the planning period.

Societal and amenity costs / benefits will be assessed in more detail in Gate 2.

Query : Have any conclusions been drawn on comparing current best values between the 5 options presented – particularly between Options A1 and B, both of which would enable 75 Ml/d to be supplied to STT.

VA RAPID Query Consolidatied Report

Further detailed network modelling is to be undertaken in Gate 2 to determine the full scope and cost (including benefits) of all 5 options. For Option A1 vs Option B, it is envisaged currently that Option A1 will maximise the use of existing infrastructure (including new pumping stations) whilst Option B will require new infrastructure (and a new pipeline and pumping station). Value engineering is required to determine the most cost effective (value) solution.